

ABSTRACT OF THE DISCLOSURE

In order to realize a dual gate CMOS semiconductor device with little leakage of boron that makes it possible to divisionally doping a p-type impurity and an n-type impurity into a polycrystalline silicon layer with one mask, a gate electrode has a high melting point metal / metallic nitride barrier / polycrystalline silicon structure. The boron is pre-doped in the polycrystalline silicon layer. The phosphorus or arsenic is doped in an n-channel area. Then, the annealing in a hydrogen atmosphere with vapor added therein is performed. As a result, the boron is segregated on the interface of the metallic nitride film and the phosphorus is segregated on the interface of the gate oxide film, for forming an n+ gate.